FILE COPY

Office - Supreme Court, U. S.
FILED
MAR 28 1945
CHARLES ELMORE CROPLEY
CLERK

IN THE

Supreme Court of the United States

OCTOBER TERM, 1944

No. 656

SINCLAIR & CARROLL COMPANY, INC.,

Petitioner,

v.

INTERCHEMICAL CORPORATION,

Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT.

BRIEF FOR RESPONDENT

ROBERT W. BYERLY,
RALPH M. WATSON,
Counsel for Respondent.

SUBJECT-MATTER INDEX.

	PAGE
SUMMARY OF ARGUMENT	iii
OPINIONS BELOW	1
JURISDICTION	1
QUESTIONS PRESENTED	1
STATEMENT OF FACTS	2
I. Before the Gessler Disclosure	2
Printing Ink	2
Printing Machinery	3
Heat Drying in Printing Industry	4
II. The Gessler Disclosure	9
The Claims of the Patent	14
III. The Effect of the Gessler Disclosure	18
IV. The Facts Bearing on Infringement	23
V. Prior Patents and Publication	27
Jirousek Patent	27
Lefferts Patent	28
Doughty Patent	29
Hanson Article	32
ARGUMENT	35
On Validity	35
On Infringement	40
Petitioner's New Contention	41
Petitioner's Technical Argument	48
Conclusion	52

Table of Cases.

	PAGE
Atlantic Works v. *Brady*, 107 U. S. 192	39
Badische Anilin & Soda Fabrik v. *Kalle*, 94 Fed. 163, aff. 104 Fed. 802	32
The Barbed Wire Patent, 143 U. S. 275	35
B. B. Chemical Co. v. *Cataract Chemical Co.*, 122 F. (2d) 526	37, 39
Carnegie v. *Cambria*, 185 U. S. 403	36
Cuno Corp. v. *Automatic Devices Corp.*, 314 U. S. 84	36
Densmore v. *Scofield*, 102 U. S. 375	36
Dewey & Almy Chemical Co. v. *Mimex Co.*, 124 F. (2d) 986	31
Diamond Rubber Co. v. *Consolidated Tire Co.*, 220 U. S. 428	35
Dow Chemical Co. v. *Halliburton Oil Well Cementing Co.*, U. S. S. C., decided March 5, 1945	15, 39
E. I. duPont deNemours & Co v. *Glidden Co.*, 67 F. (2d) 392	39
Expanded Metal Co. v. *Bradford*, 214 U. S. 366	35
Goodyear Tire & Rubber Co. v. *Ray-O-Vac Co.*, 321 U. S. 275	31, 35, 39, 41
Hartford-Empire Co. et al v. *United States*, U. S. S. C., decided January 8, 1945	39
Holland Furniture Co. v. *Perkins Glue Co.*, 277 U. S. 245	15, 38
Krementz v. *S. Cottle Co.*, 148 U. S. 556	35
Kwik Set v. *Welch Grape Juice Co.*, 86 F. (2d) 945	15
Lake Shore &c. R. Co. v. *Car-Brake Shoe Co.*, 110 U. S. 229	51
Loom Company v. *Higgins*, 105 U. S. 580	35
Picard v. *United Aircraft Corp.*, 128 F. (2d) 632	35
Smith v. *Snow*, 294 U. S. 1	52
Towne v. *Eisner*, 245 U. S. 418	49
United Carbon Co. v. *Binney & Smith Co.*, 317 U. S. 228	17

SUMMARY OF ARGUMENT.

The printing ink of the Gessler patent in suit possesses both of two desired qualities which had previously been obtained only separately in different inks for different presses. It travels over a series of distributing rollers of an ordinary printing press without drying or changing its consistency, just as did the wholly non-volatilizable inks previously used on such presses. It can be dried instantly on the paper at the moderate temperature to which paper may safely be heated, just as were the highly volatile inks previously of use only on special presses having no distributing rollers.

Gessler discovered the exact point or degree of volatility required in the liquid part of a printing ink for the phenomenon of stability on the distributing rolls of a printing press, and the degree or range of volatility required for the phenomenon of instantaneous drying of ink printed on paper. He disclosed that the volatility points required for these two antagonistic phenomena were such as could be obtained by a moderate change in temperature in a single solvent, if the solvent were in the small class which exhibits a remarkably quick increase in volatility on heating above room temperature. Thus, he disclosed two things not previously known: (1) that an ink having the antagonistic properties required for high-quality printing on high-speed presses could be made from known materials, and (2) the range of the physical property determining volatility required in the liquid ingredient of such an ink.

The ink having a liquid ingredient *within the specified range* was a new product:

> "The glue made of this ingredient *within the specified range* was a new product. * * * As such it was entitled to the protection of a patent". (*Holland Furniture Co.* v. *Perkins Glue Co.*, 277 U. S. 245, 255).

In a very recent case, this Court has again recognized patentable invention in the discovery of a "definite point or range" "corresponding to a physical phenomenon" (*Dow Chemical Co.* v. *Halliburton Oil Well Cementing Co.*, decided March 5, 1945).[1]

Gessler's disclosure of how to make an ink having the two antagonistic properties required for high-speed high-quality printing was made to the Patent Office by the filing of his application in 1932. In the same year, it was made to the printing industry by demonstrating the operation of the ink described in the application on a high-speed press, and furnishing it to others who analyzed it and determined the volatility properties of its solvent.

The value of the disclosure is attested by the proofs. Before the disclosure, no one had made an ink which could be used for high-quality printing on high-speed presses. After the disclosure, no one made such an ink without access to the disclosure. Those to whom the disclosure was made had no difficulty in making such an ink. Some made it with the identical solvent of the first Gessler ink. Others made it with a cheaper solvent having the same volatility properties.

The first imitators to use a cheaper solvent pretended to have thought of the invention before the Gessler ink was demonstrated to them, and a long litigation in the Patent Office was necessary to dispose of this claim.

The present litigation was brought to stop the infringement of a late-comer. Petitioner made no quick-drying ink

---

[1] The patent there in question could not be sustained on the ground that a "definite dilution point or range is discovered corresponding to a physical phenomenon", since the patent itself negatived any such discovery by stating that concentrations *outside* the specified range could be used. The specification and claims of the Gessler patent are limited to the range which Gessler discovered to correspond to the physical phenomena.

until after the value of the Gessler invention had been established and printers had, on the strength of respondent's demonstrations of the ink, invested in rotary presses to enable them to take advantage of the antagonistic properties of the ink which made fine printing on such presses possible. Then petitioner merely duplicated one of respondent's commercial inks made under the patent, and sold it to respondent's customers.

The District Court held the patent anticipated by prior patents disclosing inks for other purposes. The Circuit Court of Appeals, after a careful examination of the record, ascertained that no one of these patents described an ink whose solvent ingredient was within the range specified in the Gessler patent nor any ink which could be used for doing high-grade printing on high-speed presses. It sustained the patent, and held it infringed by petitioner.

In attacking this decision, petitioner refuses to recognize the nature of the disclosure on which the Gessler patent is based and endeavors to explain away its results. Petitioner's various suggested explanations of why high-grade printing on high-speed presses had not been done before Gessler's disclosure (Pet. Br., p. 18) are unconvincing. They contain a ten-fold exaggeration of the cost of a heater for drying the new ink, and ignore the proof that printers were glad to incur the expense of heaters, as well as the much larger expense of obtaining additional rotary printing presses, as soon as they learned of the new ink which made possible high-grade printing on such presses. Petitioner also ignores the long-felt want for such an ink as to which the opinions of the two lower courts contain concurrent findings.

In this Court, petitioner has attempted, for the first time, to make its purely technical argument against

infringement appear substantial. The exigencies of the case have forced the petitioner into the contention that the slight difference between its ink and the specific ink described in the patent is of some practical importance. Its claim that its ink required a different heater to dry it was not presented to or passed on by either court below and has no basis in fact.

Since petitioner's brief presents this new and unsound view of the fact situation and ignores the facts on which the Circuit Court of Appeals based its decision, we shall review the facts in some detail to make it entirely clear that:

(1) An ink made from a solvent ingredient within the range specified in the Gessler patent was a new product which is patentable under this Court's decisions in *Holland Furniture Co.* v. *Perkins Glue Co.*, 277 U. S. 245, and *Dow Chemical Co.* v. *Halliburton Oil Well Cementing Co.*, decided March 5, 1945.

(2) This new ink eliminated the difficulties caused by the slow drying of linseed-oil inks which had long plagued the printing art, and made possible for the first time the use of high-speed rotary presses for doing high-grade printing on smooth paper, so that it is clearly patentable under this Court's decisions in *Loom Company* v. *Higgins*, 105 U. S. 580, 589, 591, and the other cases relied on in the majority opinion in *Goodyear Tire & Rubber Co., Inc.* v. *Ray-O-Vac Co.*, 321 U. S. 275.

(3) The actual proven effect of Gessler's disclosure was to make an important "step in advance in the useful art" of printing, so that it forms a valid consideration for patent rights and is clearly patentable under this Court's decision in *Atlantic Works* v. *Brady*, 107 U. S. 192, 200, relied on in the dissenting opinion in *Goodyear Tire & Rubber Co., Inc.* v. *Ray-O-Vac Co.*, 321 U. S. 275.

(4) Petitioner copied respondent's commercial ink made in accordance with the claims of the patent so as to obtain the full benefit of the Gessler disclosure without having contributed anything to the making or the introduction of quick-drying ink, and is clearly an infringer under this Court's decisions in *Goodyear Tire & Rubber Co., Inc.*, v. *Ray-O-Vac Co.*, 321 U. S. 275, 278, and *Smith* v. *Snow*, 294 U. S. 1, 14.

A rotogravure press used an entirely different kind of ink from an ordinary printing press. The printing cylinder dipped directly in a tank or trough of ink which filled the recesses in the plate and was then wiped off the rest of the surface of the cylinder. The ink used was a thin liquid consisting mainly of a thin volatile oil. This could be used because the ink is not passed over a series of distributing rollers. The paper on which the ink was printed was heated by a steam drum or a blast of hot air. This dried the ink very rapidly without injuring the paper, as the volatile oil in the ink boiled at a low temperature.

There was one other special type of printing in which a volatilizable ink had been dried by heat. This was the hot stamping of metallic inks on bookbindings. It was done on small stamping presses in which the type or die was maintained at a high temperature by an electric heater.[3] The inks were less volatile than those used in rotogravure printing, but the type was kept at the boiling point of the liquid in the ink and so dried the ink as it was being applied.[4] The temperature of the die was very much hotter than the temperatu e to which paper may be raised without scorching.[5]

The rapid drying obtained by heat in these special processes naturally suggested the use of similar methods in ordinary printing, so as to make newspaper presses available for doing high quality printing:

The owner of the patents on the hot-stamping inks who had a large printing establishment tried to use them in ordi-

---

[3] I, pp. 690-691.

[4] II, p. 964, ll. 84-99; I, pp. 350, 691.

[5] See II, p. 840.

printing on the other side. In printing on soft absorbent paper such as newspaper, the rotary web press could be used notwithstanding the fact that the second side of each part of the web is printed only a few seconds after the first side has been printed. This was done without smudging only because the ink printed on the first side of the web was absorbed into the soft paper.[1]

The slow hardening of linseed-oil inks had made it impossible to use rotary presses for high-grade illustrated magazines which must be printed on smooth and non-absorbent paper.[2] It thus precluded the obvious saving of time and space which would have been achieved by the use of such presses in magazine printing. The economies which could be made by hastening the drying of printing ink have been apparent during forty years or more[3] during which high-speed roller presses have been available for printing newspapers.

Heat is the most obvious way of hastening the drying of anything. This has been part of the knowledge of the human race ever since our first caveman ancestor got wet in a shower and then lay out in the hot sun to dry. "Drying", in this sense, means evaporation, and applies only to liquids which are volatilizable, that is, capable of being evaporated.

Hastening drying by applying heat to a volatilizable liquid is an expedient which had long been used in the printing industry. Its most important use had been in the special type of printing known as rotogravure or intaglio, which is, in a sense, the opposite from ordinary printing. The ink is deposited on the paper from engraved recesses or pockets instead of from raised type and raised dots.[4]

---

[1] Admitted in Pet. Br., pp. 7, 8.
[2] I, p. 587, Q 24; pp. 600-602; p. 625, Q 28.
[3] I, pp. 148, 605, 627.
[4] Rotogravure printing is described at I, pp. 97, 157-158, 501, 556, 602-603, 616-617, 629-630, 635-636.

If in passing over the distributing rolls, an ink changes its consistency, the work of the skilled ink-maker who originally compounded it is lost, the consistency of the ink on the type is wrong, and good printing cannot be obtained.[3] To avoid all danger of such a change, it had long been customary to use as the liquid part of a printing ink an oil which is non-volatilizable.[4] The oil ordinarily used was linseed oil which is incapable of any evaporation.[5] Ink made with this oil necessarily has the same consistency when it reaches the type as it did when it started its journey across the distributing rollers. It, therefore, prints perfectly if given the correct consistency in the first place.

The linseed oil in an ordinary printing ink of course remains non-volatile after the ink has reached the paper. It has, however, the capacity of slowly absorbing oxygen from the air and undergoing a chemical alteration which changes it from a liquid into a solid.[6] This hardening, or drying as it is sometimes inaccurately called, takes anywhere from one hour to twenty-four hours.[7]

Printing machinery reached a highly developed stage many years ago. Printing presses include the flat bed type which prints on one side of a sheet of paper and the rotary web type which prints first on one side and then on the other side of a rapidly traveling continuous web of paper. In doing high quality printing on smooth paper, it had been necessary to use the flat bed type and to wait from one to twenty-four hours after printing on one side of the sheets before inserting them in the press again and

---

[3] I, pp. 31, 70.

[4] I, pp. 65-66, 110, 148, 585.

[5] I, p. 216.

[6] I, p. 358.

[7] I, pp. 148, 152, 162, 214, 592, 626.

STATEMENT OF FACTS.

I. BEFORE THE GESSLER DISCLOSURE.

The Gessler patent in suit describes a printing ink which may be dried instantly by heat applied to the paper on which it is printed. To understand the disclosure of the patent and its significance; it is necessary to have some knowledge of printing ink, printing machinery, and the use of heat-drying in the printing industry before Gessler's disclosure was made.

Printing ink, unlike writing ink, is a thick substance like paste so that it may stand on raised type and the raised points and lines of cuts and be transferred to paper pressed against them. The thickness or consistency of the ink is of great importance in obtaining good printing. There has grown up a whole profession of ink-makers who are skilled in the art of mixing printing ink ingredients so as to obtain just the best consistency to work on particular papers and on particular printing presses. To apply a modern term to a very old art, this is the "know how" of the business of manufacturing printing ink.[1]

In order to use a thick ink such as a printing ink, it is necessary to spread it out in a very even, thin film on the face of the type and on each of the minute raised dots on the plates from which pictures are printed. This is done by passing the ink over a long series of rollers which have various different motions and distribute the ink and spread it out more and more evenly and thinly until at the last roller the film is in just the right condition to be applied to the type or plates.[2]

---

[1] I, pp. 65-67, 219-220, 531-532.

[2] I, pp. 29-31, 67-69, 636; II, p. 743.

IN THE

Supreme Court of the United States

OCTOBER TERM, 1944.

No. 656.

SINCLAIR & CARROLL COMPANY, INC.,
Petitioner,

v.

INTERCHEMICAL CORPORATION,
Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT.

BRIEF FOR RESPONDENT.

Opinions Below.

Opinion of District Court, 50 F. Supp. 881.
Opinion of Circuit Court of Appeals, 144 F. (2d) 842.

Jurisdiction.

The judgment of the Circuit Court of Appeals was entered August 28, 1944. The writ of certiorari was granted December 11, 1944. Jurisdiction rests on Section 240(a) of the Judicial Code, as amended by the Act of February 13, 1925 (U. S. C., Title 28, Sec. 347).

Questions Presented.

Is Gessler Patent No. 2,087,190 for a printing ink valid?
Is the patent infringed by petitioner's ink?

nary printing but found they would not work except when applied with a hot die.[1] His experience was confirmed by that of petitioner's expert who tried to demonstrate that the hot-stamping ink could be used in ordinary printing, but found it necessary to make a complete change in the formula of the ink in order to do even passable printing.[1]

Rotogravure inks were altogether too thin and volatile to be passed over the distributing rollers of ordinary presses printing from type,[2] but the success of heat drying in rotogravure led to various attempts to use heat to hasten ink drying in ordinary printing, and apparatus for this purpose was developed long ago:

> A British patent of 1925 shows the provision of a steam-heated drum such as was commonly used on rotogravure presses[3] to heat the printed paper in an ordinary printing press.[4]
>
> An American patent applied for in 1924 described a pressure gas heater for heating the printed paper in a printing press.[5] The pressure burners projected flame and "intense" heat on the printed paper, but, owing to the rapid movement of the paper, the flame did not heat the paper to a temperature which scorched it.[6] The apparatus contained the arrangements necessary to turn off the heat when the paper stopped so as to avoid danger of burning the paper.[7]

---

[1] See proofs discussed in connection with Doughty patent, *infra*, pp. 29-30.

[2] I, pp. 636-637.

[3] I, p. 97.

[4] II, pp. 1013-1015.

[5] Brunell patent No. 1,592,806, II, p. 998.

[6] II, p. 1002, ll. 54-70.

[7] II, p. 1001, ll. 91-98.

These heating devices, while effective in heating the printed matter, were not widely used before the Gessler invention. Contrary to the hopes of those who designed these heaters, it was found that heat had only a slight effect on the chemical hardening or crystallization of the linseed oil used in printing inks for ordinary printing.[4]

An unsuccessful effort which also involved the use of heat was made by a man named Jirousek in about 1930. The formula of his first inks is not disclosed, but, according to the testimony and his patent applied for in 1932, his idea was to add a little volatile liquid and wax to linseed-oil ink.[5] His ink attained some initial success for use on flat bed presses where it reduced somewhat the length of the time which it was necessary to wait before printing on the second side of the paper.[6] In an advertisement, he said that his ink would dry in one hour.[7] This is, of course, not nearly fast enough to permit printing on smooth paper in a rotary press where there is a lapse of only a few seconds between printing on the two sides of the paper, and the ink proved unsuccessful on such a press.[8] The advertisement is, however, interesting in showing the demand for a printing ink which would dry quickly, and the fact that in those days an ink which dried in one hour was considered a quick-drying ink.

Other attempts to do high-quality printing on rotary presses are described by the District Court in its opinion:

> "Many experiments were tried to make it possible to immediately print the second side. A traveling

---

[4] II, p. 1000, ll. 100-105; I, pp. 162, 216.

[5] I, pp. 442-43, 450, 495, 670, 699; II, p. 983.

[6] I, pp. 416, 419, 429, 433-434, 467-468, 490, 493, 495, 499-500.

[7] Ex. Q-1.

[8] I, pp. 696-700.

blotter was used which traveled along behind the paper, and then was rolled up on a different roll. This not only did not prevent smudge entirely, but took a good deal of the wet ink off the paper, so the final copy was light; that is, did not have ink enough on it. [Such attempts ran from 1917 to 1930, I, pp. 149-53; p. 615, XQ. 47.]

"Therefore the art attempted to make the ink dry faster by causing the drying oil to absorb oxygen faster. This by heating and blowing ozone on it. That is, after the sheet came out from the type, and before the second side was printed, it was passed over a steam roller or device which warmed the paper. At the same time ozone was blown on it—ozone being a very active form of oxygen—which was absorbed by the oil faster than it would be if it was just quietly exposed to the air. [I, p. 79; II, p. 990, 1st par.]

"This method did not prove commercially successful. Shooting ozone on the paper was a difficult and dangerous thing to do in a printing plant, although it did make the drying oils oxidize more rapidly than they had before. *That seems to have been the status of the art when the invention in question appeared.*" (II, pp. 1025-1026).

In this finding the Circuit Court of Appeals concurred:

"It was at first sought to correct this difficulty by running a separate web of 'treated manila' through the press underneath the web of the paper that had been printed for the purpose of protecting the wet ink on the first side at the time when the second impression was being made. There were various other attempts to prevent smudging when linseed oil was used in the ink and at the same time to maintain a high speed in printing, but it remained impossible to print on smooth paper in a high speed press until an ink was discovered that would dry instantly when the proper time arrived." (II, p. 1095).

And from these undisputed facts the court drew the inevitable conclusion that there was "a long felt want" for such an ink (II, p. 1103).

II. THE GESSLER DISCLOSURE.

The Gessler patent described the long desired ink. It disclosed that the ink could be made of known materials and gave the information necessary for selecting the principal ingredient of the ink so that all those skilled in the art could make it.

To understand the patent, it is necessary to know the meaning of the scientific term "vapor pressure" which provides a quantitative measure of the volatility of a liquid.

Vapor pressure is a molecular pressure existing within a liquid and tending to force its molecules out through its surface, or, in other words, tending to cause the liquid to change into a gas or evaporate. Except in the case of water, whose evaporation is delayed by the normal presence of water vapor in the atmosphere[1], the amount of the vapor pressure of a liquid indicates the rate at which it will evaporate.

The vapor pressure of any one liquid increases as the temperature of the liquid is increased. In order to specify the inherent vapor pressure characteristic of some particular liquid, it is, therefore, necessary to specify its vapor pressure at some particular temperature, or better, at a number of different temperatures.

---

[1] I, pp. 371, 666.

Vapor pressure is ordinarily expressed quantitatively in the same units as barometric pressure. It is measured by the linear height of a column of mercury which will balance the pressure.

Certain relations between vapor pressure and rate of evaporation are well recognized:

> When the vapor pressure of a liquid is zero, there is no evaporation.[2]
>
> When the vapor pressure of a liquid is 30 inches, that is, equal to atmospheric pressure, the liquid is actively boiling.[3]
>
> Ordinary volatile liquids, such as alcohol and toluol, which must be kept tightly corked to avoid loss, have vapor pressures of one or two inches at room temperature.[4]
>
> Some evaporation occurs even in a liquid whose vapor pressure is very low.[5]

With this measure of volatility in mind, we may state specifically the requisites of an ink for use in printing on smooth paper in a high-speed rotary press, as envisaged by those skilled in the art:

(1) At room temperature, the ink must be non-volatile so as to maintain its consistency in its long travel over the distributing rollers. A vapor pressure of zero at room temperature would accomplish this. This requirement was so impressed on those skilled in the art that no one had suggested for regular printing operations the use of any

---

[2] I, pp. 52, 321.

[3] I, pp. 27-28.

[4] Alcohol has v. p. of 4 cm. or 1.6 in. Toluol has v. p. of 2 cm. or 0.8 in. (I, pp. 662-665).

[5] I, p. 47.

ink whose liquid component contained more than a minor proportion of any liquid whose vapor pressure was not zero.[6]

(2) At a temperature to which paper may be raised without scorching it, the ink must dry in the few seconds available between first and second side printing. This would be accomplished by the use in the ink of a liquid having a vapor pressure of 30 inches at 150°C. so that the liquid would boil away instantaneously. The firmness with which this requirement was fixed in minds of those skilled in the art is apparent from (a) the use in rotogravure printing of oils boiling at very low temperatures, (b) the boiling off of the solvent by a hot die in the hot-stamping method, and (c) an express reference to the need of a vapor pressure of 30 inches in an article published before the Gessler invention was disclosed.[7]

It was thus apparent that the desired ink could be made by the use of a solvent having a vapor pressure of zero at room temperature and a vapor pressure of 30 inches at 150°C. The only difficulty in compounding such an ink arose from the fact that there was not and is not any solvent having these two properties.

How Dr. Gessler overcame this difficulty appears from the specification of his patent (II, p. 733):

The specification begins by stating the object of the invention—to create a new type of printing ink that does away with the disadvantages associated with ordinary printing inks. The disadvantages arising from the slow

---

[6] The ink of the Jirousek patent had 20% of a volatilizable liquid (I, pp. 359-360, 670; II, p. 760). The other prior art cited does not describe any ink for regular printing containing any such liquid.

[7] II, p 990, second column, third paragraph. See pp. 32-34, *infra*.

drying of the linseed oil used in ordinary printing ink are then pointed out in some detail.[1]

The existence of the disadvantages referred to is fully confirmed by the proofs. The statement that the drying of prints made with ordinary inks takes many hours or even days[2] accords with the experience of practical printers[3]; the "dependency of the printing process upon the time required to obtain a complete drying"[4] was a serious disadvantage in magazine printing in requiring early closing dates[5] ;and the use of extra paper to prevent smudging[6] is described in attempts to print on smooth paper in high-speed presses[7].

The specification next refers to the proposed use of ordinary lacquers as printing inks. Reference is made to the high volatility of lacquer solvents, and it is stated that inks made from them dry on the plates or rollers of the press and, therefore, cannot print well.[8]

Dr. Gessler then says that he has discovered that this difficulty may be avoided by using "solvents with high boiling points".[9] This discovery was out of line with the experience of the printing art, for a high boiling solvent is not a non-volatilizable liquid like linseed oil whose vapor pressure is zero at all temperatures.[10] But the disclosure was not merely that the vapor pressure of the ink on the distributing rollers may be something greater than zero,

[1] II, p. 733, 1st col.
[2] II, p. 733, col. 1, ll. 32-33.
[3] I, pp. 99, 148, 151, 555, 592, 626.
[4] II, p. 733, col. 1, ll. 24-26.
[5] I, p. 624.
[6] II, p. 733, col. 1, ll. 37-40.
[7] I, pp. 148-150.
[8] II, p. 733, col. 1, l. 41 to col. 2, l. 2.
[9] II, p. 733, col. 2, ll. 3-6.
[10] I, pp. 52, 216.

which would have been of little help. It was specific. It named an illustrative high boiling solvent, diethylene glycol monobutyl ether,[1] and said that with an ink made with this solvent

> "the printing operation may be carried out *in the ordinary manner* and at ordinary temperatures" (II, p. 733a, col. 2, ll. 17-19).

This discloses to the printer that an ink made with a solvent whose vapor pressure is as low as that of the illustrative solvent at room temperature may be passed over the distributing rollers without changing its consistency.

This was a disclosure of great value, for it showed that a volatilizable liquid with a room-temperature vapor pressure as low as about one one-thousandth of an inch[2] could be used instead of linseed oil. Petitioner learned the importance of this discovery when it attempted to use ink containing a solvent with vapor pressure a little bit higher than this and found that it did not work.[3]

The specification contains another disclosure equally valuable and more startling. In referring to the same illustrative solvent, Dr. Gessler said:

> "When heated to *about 100° C. or above*, the rate of vaporization is greatly accelerated and, when used in the ink of this invention, produces *a print which dries almost instantaneously* when subjected to such a heat treatment" (II, p. 733a, col. 1, ll. 4-9).

From a table in the specification, it appears that the heating "to about 100° C. or above" specified in the state-

---

[1] II, p. 733, last line.

[2] The illustrative solvent has at room temperature (20°C.) a vapor pressure of 0.02 mm. or 0.0008 in., or about one one-thousandth of an inch (II, p. 733a, col. 1, l. 68).

[3] See p. 30, *infra*.

ment quoted brings the vapor pressure of the illustrative solvent up from below one one-thousandth of an inch to something between a quarter of an inch (at 100°)[2] and two and a third inches (at 150°)[2], or roughly, to a vapor pressure of about an inch or two. This is the vapor pressure which ordinary volatile liquids, such as alcohol, have at room temperature, but everyone knows that when a bottle of alcohol is uncorked the alcohol does not boil or disappear instantaneously. Instantaneous evaporation ordinarily means boiling. Boiling means a vapor pressure of *thirty* inches.

But, in the statement quoted, Gessler disclosed the surprising fact that not *thirty* inches but only *one or two* inches of vapor pressure is sufficient for instantaneous drying of the very thin film of ink in a print.

The importance of this surprising disclosure lies in the fact that, while there are no solvents whose vapor pressure is below one one-thousandth of an inch at room temperature and can be brought to thirty inches by a heat which paper will stand, there are a few known solvents whose vapor pressure can be brought up from this low value to one or two inches by such heating. With such solvents, Dr. Gessler disclosed, an ink can be achieved which does not change its consistency on the rollers of a press and which may be instantly dried on the paper. *What had been considered impossible was shown to be simple to achieve.*

The Claims of the Patent.

The scope of the claims is definitely limited to Gessler's discovery. He pointed out that the long desired ink could be made by selecting a known solvent from a small class

[2] 6.4 mm. is 0.25 in. 60 mm. is 2.36 in. (II, p. 733a, col. 1, l. 70).

having special and peculiar physical properties. The claims define this characteristic ingredient of the ink by the physical property referred to in the specification. They give the range of vapor pressure of the solvent, stating limits at two different temperatures. They thus define the new product in precisely the manner in which this Court has stated that such a product should be defined:

> "One was to describe the product by *describing its characteristic ingredient with particularity.* * * * he did this by indicating *the range of water absorptivity*, or stated in another way the degeneration, of the starch ingredient in Perkins' glue. * * * The glue made of this ingredient *within the specified range was a new product.* * * * As such it was entitled to the protection of a patent". (*Holland Furniture Co.* v. *Perkins Glue Co.*, 277 U. S. 245, 255)

In defining the vapor pressure range of the solvent ingredient, the claims avoid the use of artificial or arbitrary limits which could not correspond to the physical phenomenon discovered, in compliance with a decision recently cited with approval by this Court:

> "A patentee may not arbitrarily select a point in a progressive change and maintain a patent monopoly for all operations in that progressive change falling on one particular side of that arbitrarily selected point. It is only where the selected point corresponds with the physical phenomenon and the patentee has discovered the point at which that physical phenomenon occurs that the maintenance of a patent monopoly is admissible." (*Kwik Set* v. *Welch Grape Juice Co.*, 86 F. (2d) 945, 947, cited in this Court's decision in *Dow Chemical Co.* v. *Halliburton Oil Well Cementing Co.*, decided March 5, 1945)

The low temperature limit in the claims requires a solvent whose vapor pressure is "as low as" that which the illustrative solvent has at room temperature. This limit is so definite that it might appear arbitrary, but the proof shows that it corresponds to a physical phenomenon which Gessler discovered, namely, that an ink must have a room-temperature vapor pressure as low as that of the illustrative solvent in order that the ink may pass over the distributing rollers of a press without drying or changing its consistency. It is proved that, while inks made with the illustrative solvent have been and are successfully used without any drying on the distributing rolls[1], inks made with solvents whose room-temperature vapor pressures are slightly above the limit do not operate in this way and are unusable in ordinary printing[2].

The high temperature limit in the claims requires that the solvent, when raised to a temperature of 150° C., have a vapor pressure which "approximates that of ethyl alcohol at ordinary temperatures". This limit corresponds to a physical phenomenon which Dr. Gessler discovered, namely, that instantaneous drying of the thin film of ink in a print required, not 30 inches or 76 centimeters of vapor pressure to boil away the solvent as previously thought necessary, but merely that "at elevated temperatures, this

---

[1] I, pp. 71, 75, 78, 81, 113, 132, 199-200, 210, 212, 229-230, 234, 706-707.

[2] Solvents having vapor pressures at room temperature slightly above the limit specified in the claims and slightly higher than that of the illustrative solvent include *butyl cellosolve*, *carbitol* and *terpineol*. Inks were made with *butyl cellosolve* and *carbitol* by Dr. Gessler before he filed his application and when tested on a press were found to dry on the rollers (I, p. 707).

Terpineol is the solvent used in the ink which was used in the hot stamping of book bindings and is described in the Doughty patent which neither the owner of this patent nor petitioner were able to use in ordinary printing (See *post*, pp. 29-30).

solvent becomes a highly volatile liquid like such highly volatile liquids as, for example, ethyl alcohol".[1] The elevated temperatures referred to are "about 100°C. or above",[2] and the table in the specification[3] shows that between 100°C. and 150°C. the vapor pressure of the illustrative solvent is from just below 1 cm. to 6 cm., a variation of a few centimeters *each way* from the vapor pressure of alcohol, 4 cm.[4]

While alcohol (v. p. 4 cm.) is a typical highly volatile solvent, there are many others. Two others, butyl acetate (v. p. 1.5 cm.) and toluol (v. p. 2 cm.) were demonstrated at the trial. The court tests, although of course not scientifically accurate, were sufficient to show that both butyl acetate and toluol have substantially the same volatility as alcohol (I, pp. 662-666). Thus, the highly volatile solvents of which alcohol is typical, have vapor pressures which approximate that of alcohol within a few centimeters, so that the expression used in the claim is not an artificial limit but accurately defines to one skilled in the art one of the essential qualities of an ingredient of the ink disclosed in the specification.[5]

The proofs make it clear that the high temperature limit of the claims corresponds to the phenomenon of instantaneous drying of the film of ink in a print, for they show that the inks now in extensive use which dry instantly

---

[1] II, p. 733a, col. 1, ll. 72-75.

[2] II, p. 733a, col. 1, l. 5.

[3] II, p. 733a, col. 1, l. 70.

[4] The vapor pressure of the illustrative solvent equals that of the volatile liquid butyl acetate (1.5 cm.) at 115°C., and that of the volatile liquid alcohol (4 cm.) at 140°C. (I, pp. 33-36).

[5] The use of the word "approximates" to cover this small range and thus make the claim commensurate with the invention under the physical facts presented in no way resembles the situation considered by this Court in *United Carbon Co.* v. *Binney & Smith Co.*, 317 U. S. 228, where the novelty claimed was in the size of the particles of the final product, and the patentee sought to cover large and small particles whose diameters differed in the ratio of 25 to 1 (317 U. S. 234).

at a temperature which does not scorch the paper contain solvents whose vapor pressures at 150° C. approximate that of alcohol within a couple of centimeters[1], and no ink for use in ordinary printing which exhibits this phenomenon has been shown to have a vapor pressure outside this range.

III. THE EFFECT OF THE GESSLER DISCLOSURE.

The effect of the disclosure of the Gessler patent on the printing industry is not a matter of speculation. In 1932, Gessler made essentially the same disclosure to the printing industry that is made in the specification of his patent. In May of that year, the specific ink described as an example in his patent was tested on a commercial high-speed typographic printing press provided with means to heat the web of paper after it was printed, and demonstrated that the instantly-drying ink needed for high-speed printing presses had at last been produced. The ink did not dry or change its consistency during its travel over the ink rollers. The ink was dried instantly by heat applied to the paper.[2]

After this demonstration, Dr. Gessler furnished the ink to two small printing ink companies.[3] One of them had the Gessler ink analyzed by a varnish company, duplicated

---

[1] Respondent's commercial inks contain solvents having vapor pressures from 2 cm. to 6 cm. at 150° C. (I, p. 126).

Petitioner's commercial ink has a vapor pressure of 2 cm. at 150° C. (I, pp. 50, 56).

Commercial inks made by the Curtis ink-maker after Gessler's disclosure to Curtis contain solvents having vapor pressures between 2 cm. and 6 cm. at 150° C. (I, pp. 640-641).

[2] I, pp. 71-80.

[3] For convenience, unpigmented inks were furnished so that various pigments could be added to them by the ink companies (I, pp. 81, 130-131, 164, 174).

it and supplied it to a large printing company in Kalamazoo, Michigan, where it was seen by employees of the respondent who were much astonished, as they had never before seen a typographic ink which could be dried instantly.[1] They obtained samples of the inks which were analyzed by the respondent.[2]

The other ink company sold the Gessler ink to the Curtis Publishing Company, who for years had been trying many expedients to overcome the delays caused by the slow drying of linseed-oil inks. On hearing of the first demonstration of the ink, they requested a demonstration at their plant. After obtaining a statement of what the ink contained and using it for about a year, the Curtis Company had the ink made from a cheaper material[3] by their own ink-maker and have used this ever since to enable them to print the *Saturday Evening Post* on high-speed presses.[4] Mr. Cray also made the ink from a cheaper material and demonstrated it to respondent.

Respondent's president met Dr. Gessler and learned that the two instantly-drying inks of different chemical compositions which respondent had found in widely different parts of the country were both derived directly from an ink which Dr. Gessler had originated. Unlike other ink manufacturers, respondent gave full credit to Dr. Gessler, purchased his patent application, made him head of its laboratory, manufactured his quick-drying ink, and sold it under the name of "Vaporin".[5]

By a mere demonstration of what the ink would do, respondent was able to have it adopted by the printers of many high-grade magazines of large circulation including

---

[1] I, pp. 176-77, 216-17.

[2] I, pp. 164-167, 170-173, 176-177, 185-194, 216-218.

[3] The details of the making of this copy of the Gessler ink are discussed under the head of Infringement (*infra*, p. 23).

[4] I, pp. 76, 78-83, 86, 88, 100-101, 136-137, 640-641.

[5] I, pp. 87-88, 113, 701, 713-715.

Life, *Collier's* and *The New Yorker*. The reaction of magazine printers to the new ink is the clearest proof of the long-felt want for such an ink:

One of them, who had been in the printing business for twenty-four years, said that the demand for an ink which could be dried immediately after printing had existed as long as he had been in the business. (I, p. 627.)

The manager of the largest printing plant in the world (printer of *Life* and *Time*) said:

> "We were very anxious to cooperate with any experiments that could be conducted, because we realized that an ink of this kind, if it could be made to work, would revolutionize letter-press printing. * * *
>
> "Now, the reason for that was that up till then, this time, we had been forced to confine our printing on rotary presses to absorbent stocks, and we had not been able to print on rotary presses and perfect the printing on coated paper without considerable offsetting. * * *
>
> "Now, if this new ink would make it possible for us to print on coated papers, or enamel papers and perfect the sheet and then immediately fold and deliver folded signatures from the press, it would enable us to print a great deal faster than we ever had been able to print on flat bed presses on this kind of papers" (I, pp. 586-88).

When he found that the ink would work, his company invested about a million dollars in rotary presses to utilize the new ink in fast printing on coated papers (I, p. 601).

The manager of the printer of *The New Yorker* said that his company bought a heater for $5,000[1] to try out the new ink,[2] and, when they found that it really dried, in-

[1] Petitioner's brief, p. 18, gives $100,000 as the cost of a single heating device. This is not supported by petitioner's citation, I, p. 571. The investment there mentioned evidently referred to equipping a number of presses with heaters.

[2] I, p. 154.

vested half a million dollars in new rotary presses in order to use it to full advantage.[2] It happens that he himself had had experience in trying to print a magazine on a rotary press long before the Gessler ink was known.[3] He made it plain that the investment in rotary presses would not have been made if the new ink had not been available.[4]

The printer of *Collier's* said:

> "It is because of the introduction of the Vaporin or heat flash inks that the letter press field has been more or less revolutionized" (I, p. 635).

In 1936, the respondent introduced its Vaporin ink at the Hall Printing Company,[5] a large plant in Chicago. This plant continued to buy some Vaporin ink but, for the most part, had its own ink-maker, Mr. Kerley, make a similar ink for them. This he did very easily by purchasing heat-set "varnishes", that is, inks complete except for the addition of pigment.[6] The Hilton-Davis Company, after acting as chemical consultant for the respondent,[7] was selling such heat-set varnishes containing the solvents used by respondent in making its Vaporin ink.[8]

Petitioner later went into the making of heat-set inks at the suggestion of the Hall Company.[9]

Thus, only a few years after Dr. Gessler made and demonstrated the first volatilizable quick-drying ink used in ordinary printing, the use of such an ink became general wherever rapid high-grade printing was required, and

---

[2] I, p. 153.

[3] I, pp. 148-151.

[4] I, p. 153.

[5] I, pp. 545-546, 563-564.

[6] I, pp. 548-550, 565-566. See I, p. 219.

[7] I, p. 370.

[8] I, p. 367; III, Ex. 36.

[9] I, pp. 513-514, 515, 531-532.

the ink so used was based on information derived directly or indirectly from Dr. Gessler's original disclosure. Before Dr. Gessler's disclosure, no one in the printing industry was able to produce an ink for printing on smooth paper in high-speed presses, and since Dr. Gessler's disclosure no one has produced such an ink without information derived from the disclosure.

But, although those in the printing industry who received information from Dr. Gessler's disclosure were quick to make use of it, only respondent gave Dr. Gessler credit.

A long litigation in the Patent Office was necessary to dispose of the claim of the Curtis Publishing Company and their ink-maker that they had thought of the invention before Dr. Gessler's ink was demonstrated to them.[1]

The present litigation was then brought to check the parasitic infringement of an ink manufacturer who had appropriated Dr. Gessler's ink after its merits had been fully established and printers had made investments in rotary presses and heaters to enable them to realize its advantages.

---

[1] After MacGregor of the Curtis Company had witnessed successful use of the Gessler ink on a high-speed printing press (I, pp. 76-80), MacGregor and an employee of the ink-maker, Levey, filed a patent application containing a method claim which was no more than a description of the use of the Gessler ink in the manner in which it was intended to be used (Ex. M-2, p. 33). Gessler adopted the method claim to fight an interference and won (Ex. M-2, pp. 31, 33). The interference was not finished until three years after the issue of the Gessler ink patent here in suit. The Gessler method application was dropped to avoid double patenting and extension of the monopoly.

IV. THE FACTS BEARING ON INFRINGEMENT.

By far the greater part of the instantly-drying ink which has been made and sold for use on high-speed rotary presses since Dr. Gessler's first disclosure differs from the specific example given in the patent by the substitution of a less expensive solvent. But the solvents in these commercial inks resemble the illustrative solvent given in the patent in two vital respects: (1) They all have at room temperature vapor pressures which are as low as the vapor pressure of the illustrative solvent. (2) They all have at an elevated temperature of 150° C. the vapor pressures of highly volatile liquids approximating that of the typical volatile liquid, alcohol, within a couple of centimeters.[1]

The illustrative solvent of the patent which was used in the first Gessler ink was a rather expensive synthetic solvent entirely free from odor. Ink containing this synthetic solvent has continued in successful commercial use up to the present time, in printing where an ink which is both quick-drying and odorless is required.[2]

Where lack of odor was not vital, it was a simple matter to substitute for this synthetic solvent a cheaper solvent having the same vapor pressure characteristics, such as an especially selected "narrow cut" of petroleum:

Petroleum, as it comes from the ground, consists of a mixture of a large number of different chemical compounds called hydrocarbons, having different degrees of volatility, that is to say, having different vapor pressures. They run all the way from compounds which evaporate instantly at

---

[1] I, pp. 126, 640-641.

[2] I, pp. 178-183, 194, 197-199, 210-213, 229-234; Exs. 29, 30.

room temperature to compounds which cannot be evaporated by heating.[4]

The numerous different hydrocarbons in petroleum may be separated by what is known as fractional distillation. In this way, it is customary to divide them into four groups known as gasoline, kerosene, fuel oil, and mineral oil. If the separate hydrocarbons are represented by the cards of a pack, as suggested by petitioner's expert (I, p. 383), this would amount to cutting the deck into four parts, each of which would contain a large number of cards and would be what is called a "wide cut".

"Wide cuts" such as kerosene cannot be used in the Gessler ink for they are mixtures of a large number of different hydrocarbons of different degrees of volatility, some of which evaporate from the distributing rollers and change the consistency of the ink, while others remain in the ink when the paper is heated and prevent the ink from drying (I, pp. 137, 138). Such mixtures are excluded by the claims of the Gessler patent.[5]

It is possible to use fractional distillation to separate out from petroleum only one, or at most only a few, hydrocarbons. In this way, those who wished a cheaper solvent for use in Dr. Gessler's ink took from the wide range of hydrocarbons available in petroleum only those which had the vapor pressure characteristics of the illustrative solvent contained in Dr. Gessler's first ink.

The witness Cray told just how he did this:

---

[4] I, pp. 105-106, 383-384.

[5] The claims in issue specify that "substantially all of the liquid component" of the ink must have a vapor pressure complying with the specified room-temperature limit, and that "the major part of the liquid component" must have a vapor pressure within the specified elevated-temperature range. This excludes kerosene or any wide cut since only a small proportion of the hydrocarbons contained in it have vapor pressures within the specified limits.

He at first tried various petroleum products on the market and found that they would not work. He then took the matter up with a large oil company asking them to provide a petroleum cut with a narrow boiling range like that of Gessler's synthetic solvent.[1] This was a simple but perhaps unscientific way of asking for a liquid containing only a few petroleum hydrocarbons all having about the same degree of volatility, in contrast to the commercial petroleums, like kerosene, which were mixtures of a great number of hydrocarbons of different volatilities.[2] Having obtained narrow cuts from the oil company, Cray made practical tests to check their vapor pressures with that of Gessler's original solvent by comparing the action of inks made with them with inks which he had obtained from Dr. Gessler. He said frankly, "I always used that as a yardstick to check on" (I, p. 85). In this way, he had little difficulty in selecting the particular petroleum hydrocarbons whose vapor pressures were within the limits set up in the Gessler patent.[3]

Many of the Vaporin inks which respondent sold under the Gessler application and patent had solvents consisting of narrow petroleum cuts such as were used by Mr. Cray in imitating the first Gessler ink. The narrow cuts used contain only hydrocarbons within Dr. Gessler's limits. At 150° C. they all have the vapor pressure of volatile liquids, running from 2 cm. to 5 cm. and approximating the 4 cm.

---

[1] I, pp. 84-85.

[2] I, pp. 43, 105, 107, 383-384.

[3] Mr. Cray's description of his work in imitating the original Gessler ink by the use of a cheaper solvent suggests the nature of the work done by the Curtis Company and their ink manufacturer who also imitated Dr. Gessler's ink in this manner. They too first used a petroleum containing some solvent outside the limits specified by Dr. Gessler, but checked with the "yardstick" by running their inks beside Gessler's on the same press and later used narrow cuts containing only petroleum hydrocarbons within Dr. Gessler's limits (I, pp. 82, 101-102, 128-129, 136-137, 640-641).

vapor pressure of the typical volatile liquid, alcohol (I, pp. 113, 126, 127). The slight differences in vapor pressure theoretically affect the drying times of the inks (I, p. 128) but none of the witnesses who testified as to the use of the inks noted any practical difference between them.

Petitioner first went into the making of heat-set inks in 1938.[4] Its ink-makers were unable to make such inks with ordinary petroleum products,[5] but had no difficulty in making them when they obtained a special petroleum cut which had been prepared by an oil company after respondent's Vaporin ink was on the market and had been supplied to the respondent for use in its ink.[6]

The petroleum solvent which the petitioner obtained from this oil company and used in its ink is characterized by petitioner's own petroleum expert as "specially prepared material", a "very narrow cut", a "specially provided fraction" of petroleum (I, p. 196). It contains only three hydrocarbons (I, p. 59). Measurements made by both parties show that these three hydrocarbons have vapor pressures which, while not identical with Dr. Gessler's first solvent, are within the limits specified in the claims of the Gessler patent—at room temperature their vapor pressure is "as low as" that of Gessler's illustrative solvent, and at 150° C. the vapor pressure is 2 cm. which is equal to that of the liquid, toluol, which has the same volatility as the typical highly volatile liquid, alcohol,[7] so that it clearly approximates the vapor pressure of alcohol. There is no observable difference between the operation of petitioner's and respondent's inks. They print and dry in the same way on the same rotary high-speed presses.[8]

---

[4] I, pp. 513-515, 531-532.
[5] I, p. 515.
[6] I, pp. 396-397, 400-401.
[7] I, pp. 306, 665-666.
[8] I, pp. 237-238; see pp. 32-40, 51.

The use of such a specially prepared cut as an ink solvent is not a departure from the Gessler patent, but a very obvious following of the disclosure in that patent. The patent, using a synthetic solvent only as an illustration, specifies definite vapor pressure limits. Reverting to the illustration in which the cards of a pack represent petroleum hydrocarbons of different volatilities, the Gessler patent designated just which two or three of the cards in the pack could be used as a solvent in the new ink. Anyone could then merely separate these cards from the rest of the pack, and use them as an ink solvent. This was a way of following Gessler's disclosure which had been obvious to other ink-makers and had been long used by respondent.

The change made by others in Dr. Gessler's original ink and adopted by the petitioner was a mere following out of Dr. Gessler's disclosure.

V. PRIOR PATENTS AND PUBLICATION.

The proofs as to each prior patent and publication fully support the findings of the Circuit Court of Appeals in regard to them, and show that the District Court's findings as to them are clearly erroneous.

The Jirousek patent (II, p. 983) gives an extremely complicated ink formula which amounts to modifying the linseed-oil ink by the addition of a small proportion of very volatile solvents and a little wax.[1] Jirousek's ink was never used on a high-speed printing press. Before learning of the Gessler invention, respondent spent considerable money testing the Jirousek ink and found it useless.[2] The ink

[1] See cross-examination of petitioner's expert (I, pp. 359-361).

[2] I, pp. 696-701.

described in the Jirousek patent bears no resemblance to the ink described and claimed in the Gessler patent.[3]

The Lefferts patent (II, p. 957) of 1888 discloses the idea of printing on celluloid with an ink containing a solvent for celluloid so that the ink will bite into the material on which it is printed[4].

The solvent of Lefferts' ink was oil of cassia, one of the so-called "essential oils" usually used as perfumes and flavors. It is a natural mixture coming from the interior of China. Part of it is highly volatile as indicated by its strong odor which in itself precludes its use in an ink for ordinary printing (I, pp. 661-662). Its composition and vapor pressure vary from year to year. Thus, oil of cassia purchased in 1939 was found to have a room-temperature vapor pressure much higher than that of butyl carbitol, while oil of cassia purchased in 1942 was found to have a vapor pressure about the same as that of butyl carbitol (I, pp. 660-661). No one who wished to specify a definite limit of volatility or vapor pressure would rely on these natural products of variable volatility. The only definite chemical compound mentioned in the Lefferts patent is

---

[3] One-third of the liquid component of the ink has a room-temperature vapor pressure two hundred times as great as Dr. Gessler's limit (I, p. 670; II, p. 760), so that the ink is clearly not one in which substantially all the liquid component has a vapor pressure as low as the limit specified in the claims.

The major part of the liquid component of the ink, amounting to two-thirds of the liquid, is linseed oil which is non-volatile at all temperatures (I, p. 360; II, p. 760; See I, pp. 162, 216), so that the ink is clearly not one in which the major part of the liquid component has a vapor pressure at 150° C. approximating that of alcohol as specified in the Gessler claims.

[4] Lefferts did not suggest the application of heat to the printed matter to evaporate the solvent in his ink. On the contrary, he definitely stated "no drying will be found necessary, as the ink is of such nature as to rapidly harden on the material employed" (II, p. 959, ll. 9-11). This, as petitioner's expert admitted, is evidently a reference to the penetration of the solvent for celluloid into the celluloid on which the ink is placed (I, p. 330).

nitro-benzole whose vapor pressure at room temperature is far outside the Gessler limit (I, p. 332).

The Doughty patent (II, p. 961) of 1922 relates to inks for application to book bindings by means of a heated die or stamp. The ink which it describes specifically has a solvent, terpineol, whose vapor pressure is greater than that of Gessler's illustrative solvent at room temperature[1] and therefore outside the limit specified in the Gessler claims in issue.

The owner of this patent has used the ink which it describes for many years in the hot stamping of book bindings. Being in the printing business, he recognized the need for a quick-drying ink for ordinary printing and made several attempts to use the ink of this patent for that purpose, but was unsuccessful. It is plain from his entire testimony on pp. 688-696 of Vol. I, that the Doughty ink was good for nothing except hot stamping. It could be used on paper only by first sizing the paper and then applying the ink with a hot die in the same way as it was applied to book bindings (see last four Qs. on I, p. 695).

Petitioner evidently realized that the Doughty patent could not be relied on to anticipate Gessler in making a quick-drying ink for ordinary printing unless the ink which this patent described could be successfully used on an ordinary high-speed printing press; for petitioner introduced evidence of a fairly successful run on a high-speed press at which 18,000 copies were printed with what petitioner's expert called "the Doughty and McElroy[2] ink" (I, p. 309).

---

[1] It is twice the vapor pressure of butyl carbitol on Taylor Ex. I-1 in Vol. III, but published data give it three times as high (I, p. 656; III, Ex. J).

[2] The McElroy patent (II, p. 963) covers a minor improvement in the hot stamping ink of the Doughty patent. It is not mentioned in petitioner's brief to this Court.

The joker in this *ex parte* test developed in the cross-examination of other witnesses for the petitioner. *Terpineol is the solvent in the Doughty and McElroy inks* described in the patents. Doughty's formula contains terpineol alone. McElroy's formula adds *not over 5%* of the much less volatile liquid, rosin oil, as a "plasticizer"[1]. *Rosin oil was the solvent used in petitioner's test ink*—not pure rosin oil, but rosin oil to which a minor proportion of terpineol had been added, presumably to satisfy the conscience of petitioner's expert:

Solvent of Doughty patent:	Solvent of McElroy patent:	Solvent of Petitioner's test ink:
100% terpineol	95% terpineol	66⅔% rosin oil
(II, p. 962, l. 40[2])	5% rosin oil	33⅓% terpineol
	(II, p. 964, ll. 18, 19)	(I, p. 537, II, p. 757)

It is obvious that this radical change in the formula would not have been made if petitioner had been able to make the terpineol ink work successfully.

The change made by the petitioner in order to make its demonstration is conclusive proof that terpineol—the preferred solvent of the Doughty patent and the one actually used in the hot-stamping inks—is too volatile for use in a quick-drying ink for ordinary printing.

The incidental mention of the solvent terpinyl acetate in the Doughty patent is of no significance since the Doughty patent did not address itself to the problem of providing

---

[1] A "plasticizer" is a comparatively non-volatile liquid which is intended not to evaporate with the solvent when the ink is heated but to remain in the dried ink to keep it from being too brittle (McElroy patent II, p. 963, ll. 103-107; Gessler patent II, p. 733a, col. 1, ll. 10-19; see also I, p. 249).

[2] Doughty's alternative solvent, benzyl alcohol, has a room-temperature vapor pressure even higher than that of terpineol (I, p. 347, last Q.).

a quick-drying ink for ordinary printing, but to providing an ink to be applied by a hot stamp. The importance of the difference in the problems to which patents are addressed, which is noted in a late decision of this Court,[1] may be brought out by contrasting the sufficiency of the Doughty patent as a patent for a hot stamping ink and its insufficiency if it were considered as a patent for a quick-drying ink for ordinary printing:

(1) Considered as a patent for a hot stamping ink, the Doughty specification is probably sufficient, as the terpineol ink which it described was successful in hot stamping, and, so far as it appears, the numerous different solvents which it lists as equivalent to terpineol may be equivalent to it in a hot stamping ink.

(2) Considered as a patent for a quick-drying ink for ordinary printing, the Doughty specification is clearly insufficient. The terpineol ink which it discloses will not work on an ordinary printing press. The disclosure is thus worse than the typical insufficient disclosure which requires experimenting before it can be used;[2] for the man skilled in the art who found that Doughty's preferred terpineol ink would not work on an ordinary printing press could not be expected to start making and testing other inks with all the solvents which Doughty had said were equivalent to terpineol. There is nothing in Doughty's disclosure to lead him to select terpinyl acetate:

> "Thompson again shows a vague proposition by one who names a list of metals, among which he is to have unrestricted choice, and who points out none of the distinctions which must govern that choice in order to approximate Haynes' alloy". (*Haynes Stellite Co.* v. *Chesterfield*, 22 F. (2d) 635, 637.)

---

[1] *Goodyear Tire & Rubber Co., Inc.* v. *Ray-O-Vac Co.*, 321 U. S. 275, 276.

[2] *Dewey & Almy Chemical Co.* v. *Mimex Co., Inc.*, 124 F. (2d) 986, 989, C. C. A. 2.

Since the Doughty specification is insufficient to support a patent for a quick-drying ink to be used in ordinary printing, it cannot anticipate a patent for such an ink:

> "A description which is insufficient to support a patent can hardly be relied on as an anticipation. In each instance the same precision is required." (*Badische Anilin & Soda Fabrik* v. *Kalle*, 94 Fed. 163, 167; aff. 104 Fed. 802, C. C. A. 2).

The Hanson article (II, p. 990) published in 1931 shows how far the art was from the conception of Gessler which solved the problem of providing a quick-drying ink for ordinary printing.

The article points out in some detail the advantages which a quick-drying ink would have, and states the characteristics which the author felt were needed in such an ink.

But the article contains no solution to the problem of making such an ink. It suggested the undertaking of a complicated research to find some means for obtaining indirectly the effect of a theoretical, non-existent solvent:

> "Our problem becomes one to get the effect by indirect means. There is little obtainable information as to the sums of the partial pressures of mixtures of two or more solvents * * *. The drying result can be further effected by the kind, number and method synthesizing the combination of plastic gums present * * *. This opens up a none-too-well explored field of research. Further there are mordants and also catalytic chemicals serviceable to produce varying effects." (II, p. 990)

This vague suggestion for further research, which accomplished nothing, is clearly not a solution of the problem.[1]

The article directs the art away from Gessler's solution of the problem, which lay in selecting a solvent of the particular vapor pressure characteristics which he specified. Hanson dismissed such a solution as impossible. As to solvents, he said:

> "The solvents available have different boiling points ranging through a broad scale, but unfortunately for this problem their vapor pressure curves are nearly parallel. If we choose one from the group with a boiling point well under 250° F., the highest practical heat to apply to a printed sheet, we find that at room temperature its vapor pressure is still so great that drying will progress rapidly. On the other hand, if one is selected with a vapor pressure so low at room temperature that little drying takes place, at 200° to 250° F., we find the boiling point hardly attained or not even reached" (II, p. 990).

In other words, any solvent which you can boil off without burning the paper will evaporate fast enough at room temperature to make the ink dry on the rollers. Hanson thought that a solvent which could be boiled off the paper would solve the problem:

> "*If we could only flatten the curve* of a high boiling solvent with a vapor pressure of 1 in. of mercury

[1] The article states that some unidentified manufacturer has produced an ink "capable of drying with a very brief exposure to heat which will remain moist on inking rolls and plates for a long time" (II, p. 991). But this statement, even if it had been true (which it was not, II, pp. 1053, 1054, 1057) could not anticipate the Gessler invention:

> "The naked assertion that a certain result has been accomplished without stating how, without describing the means which produce the result is insufficient as an anticipation". (*American Graphophone Co.* v. *Leeds & Catlin Co.*, 170 Fed. 327, 331, C. C. A. 2.)

> or less at 80° down to a point where at *30 in. the boiling temperature would be reduced to only 150° or so* it would not take us long to compound an ink to meet the general characteristics for a plastic ink set forth above" (II, p. 990).

The vapor pressure curve is an inherent characteristic of a chemical. To "flatten" the vapor pressure curve of a solvent, therefore, means to change its inherent properties. One may search forever in solvent manufacturers' catalogs without finding one having a flattened vapor pressure curve. Hanson and everyone else knew this. His statement is just like saying "If we could only raise the freezing point of water, we could skate all summer". It warned the art that the desired ink could *not* be made by selecting an existing solvent.

ARGUMENT.

VALIDITY.

The recent decisions of this Court cited in petitioner's brief emphasize the importance of distinguishing between mechanical skill and invention. No court has adhered more scrupulously to its duty to apply these decisions than the Circuit Court of Appeals for the Second Circuit which sustained the Gessler patent. That court has refused "to mistake for invention the slow but inevitable progress of an industry" (*Picard* v. *United Aircraft Corporation*, 128 F. (2d) 632, 636).

The facts of the present case show the very antithesis of the normal "inevitable progress" within an industry. The patent here is based on an idea which was injected into the printing industry from the outside to solve a problem which the industry itself had long been unable to solve. This is made only too clear by the avidity with which those within the industry seized upon the new idea and used it to their advantage.

These facts bring the case directly under the rule of the cases relied on[1] by this Court in its opinion in *Goodyear* v. *Ray-O-Vac* (321 U. S. 275, 279). Under these authorities, this Court noted that invention is involved in filling a long-felt want even though

> "Viewed after the event, the means • • • adopted seem simple and such as should have been obvious to those who worked in the field". (321 U. S. 279)

---

[1] *Loom Company* v. *Higgins*, 105 U. S. 580, 589, 591; *The Barbed Wire Patent*, 143 U. S. 275, 277, 283; *Krementz* v. *S. Cottle Co.*, 148 U. S. 556; *Expanded Metal Co.* v. *Bradford*, 214 U. S. 366, 381; *Diamond Rubber Co.* v. *Consolidated Tire Co.*, 220 U. S. 428, 434-435.

Simplicity is in fact a common characteristic of many important inventions (*Carnegie* v. *Cambria*, 185 U. S. 403, 429) and affords a good guide for distinguishing the work of an inventor from that of an unimaginative man skilled in the art; for, when such a man tries to solve a problem, he resorts to a degree of complication suggesting the Goldberg cartoons. This is well illustrated in the present case by Jirousek's complicated ink formula in which he tried to combine a non-volatile solvent, a highly volatile solvent and a little wax to delay the evaporation of the volatile solvent, and by Hanson's suggestion of research in plastics to try to find some mixture that might have the properties of a non-existent hypothetical solvent with a "flattened" vapor pressure curve. Gessler's ink using a single known solvent is indeed simple in comparison with these efforts.

But petitioner's argument that it was "easy" to arrive at this simple solution of the problem is just the reverse of the fact.

Petitioner argues that it was easy for Gessler (Pet. Br., pp. 9, 10). But Dr. Gessler's complete answer on I, pp. 707-709, of which petitioner quotes only a sentence, shows that two years of work and study of the problem preceded the final solution. If the mental operations of the inventor are relevant to the question of patentability, the fact to which petitioner calls attention—that the final solution to the problem came to Gessler as a flash of thought—can hardly be urged to show lack of invention under this Court's decisions.[1]

Petitioner's contention that it would have been easy for any chemist to do what Dr. Gessler did is based on a

---

[1] *Densmore* v. *Scofield*, 102 U. S. 375, 378.
Cuno Corp. v. *Automatic Devices Corp.*, 314 U. S. 84, 91.

complete misunderstanding of the idea whose disclosure advanced the printing art.

It was *not* the idea of choosing a solvent to meet a particular volatility requirement. We concede without hesitation that when the degree of volatility or the vapor pressure characteristic required in a solvent for a particular purpose is known, "any good chemist would obtain the desired volatility by selecting the needed solvent". The Circuit Court of Appeals for the Second Circuit so stated in a decision preceding their decision sustaining the Gessler patent[1]. That the court was right in that case is fully confirmed by the proofs of the present case. The chemists of the Curtis Company's ink-maker, the chemists of the oil company called in by Mr. Cray, and the chemists of the oil company who supplied the petitioner had no difficulty in selecting a solvent for a quick-drying ink for ordinary printing—after they had learned of the success of Dr. Gessler's ink and ascertained the characteristics of its solvent.

But where did Dr. Gessler obtain vapor pressure specifications by which to select the solvent?

He certainly did not get them from Mr. Cray, the ink-maker who first asked Dr. Gessler for an odorless ink and later for an ink to be used on a press provided with a heater. Cray furnished Dr. Gessler with some information which was general knowledge in the printing art—that inks which dried on the rollers of a press were no good, and that heaters were used on printing presses. But as to information about the vapor pressure characteristics required in a quick-drying ink, it was the other way around. Cray frankly admitted that, although he had long recognized the need for

[1] *B. B. Chemical Company v. Cataract Chemical Company, Inc.*, 122 F. (2d) 526, 528.

such an ink (I, p. 97), he was never able to make one until he received Dr. Gessler's first ink, the specific illustrative ink described in the patent (I, p. 99, Re-direct).

Gessler certainly could not have obtained the required vapor pressure specifications from the old Lefferts patent which dealt with ink which would dissolve and penetrate the material on which it was printed and mentioned natural products, essential oils, of variable vapor pressure which could not serve as a criterion.

Gessler certainly could not have obtained the necessary vapor pressure specifications from the Doughty patent, for the solvent which it recommended for a hot stamping ink had a vapor pressure like those which Dr. Gessler had excluded as too volatile as a result of his work on odorless inks.

He certainly could not have obtained the vapor pressure specifications from the Jirousek patent which described an ink whose vehicle was a complicated mixture of linseed oil, light volatile oil and wax.

He certainly did not get the required vapor pressure specifications from the Hanson article, for Hanson gave very different specifications and admitted there was no solvent which had them.

What Gessler gave to the printing art was the new conception that an ink meeting the two antagonistic requirements of non-volatility on the rollers of a press and rapid evaporation on paper could be made with a single solvent having particular vapor pressure characteristics, and the discovery and disclosure of the vapor pressure criteria by which the solvent could be selected.

The ink having a solvent within the range established by those criteria is a new and patentable product under the principle recognized by this Court in *Holland Furniture Company* v. *Perkins Glue Company*, 277 U. S. 245, 255, and

again in its opinion in *Dow Chemical Co.* v. *Halliburton Oil Cementing Co.*, decided March 5, 1945.[1]

The Constitution indicates the fundamental test of patentability. Congress is authorized to grant exclusive rights for only one purpose: "to promote the progress of science and the useful arts". This Court has recently noted that what the inventor is required to give for the exclusive rights granted to him is a *disclosure.*[2] Consequently, if the disclosure does not "promote the progress of the useful arts", the patent is not within the constitutional provision. This is clearly brought out in *Atlantic Works* v. *Brady*, 107 U. S. 192, cited in the dissenting opinion in *Goodyear* v. *Ray-O-Vac*, 321 U. S. 275, 279:

> "It was never the object of those laws to grant a monopoly for every trifling device, every shadow of a shade of an idea, which would naturally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufactures". (107 U. S. 200)

But a disclosure which advances the useful arts constitutes a valid consideration for exclusive rights under the constitutional provision:

> "The design of the patent laws is to reward those who make some substantial discovery or invention, which adds to our knowledge and makes a step in advance in the useful arts". (107 U. S. 200)

The present record establishes in an unusual way that there was no failure of consideration in the present

---

[1] This principle has been frequently applied in federal court decisions: *E. I. duPont de Nemours & Co.* v. *Glidden Co.*, 67 F. (2d) 392; *B. B. Chemical Co.* v. *Cataract Chemical Co.*, 122 F. (2d) 526, 531.

[2] *Hartford-Empire Co. et al.* v. *United States*, decided January 8, 1945.

case. Petitioner admits that there has been since 1932 a radical change in magazine printing. The record makes clear that this change was brought about by a new type of ink, and shows that the inks which have made this change possible were all derived from the disclosure which Dr. Gessler made to the printing industry in 1932. His disclosure did not await the issue of his patent. It was made at the time of his application. It was not merely a disclosure to the Patent Office, but a disclosure to the printing industry by demonstrating the operation on a high-speed press of the very ink described in the example of the application, and supplying it to others who analyzed it. The printing industry and the public have already benefited greatly by the improvement in high-speed printing which was the direct result of Dr. Gessler's original disclosure. Clearly, the disclosure is not "trifling", but one which made a valuable "step in advance in the useful arts", and so forms a valid consideration for the grant of his patent.

INFRINGEMENT.

We have shown that after Gessler disclosed his first ink to the printing industry, the ordinary skill of a chemist enabled others to duplicate it with less expensive solvents, such as narrow cuts of petroleum, and that the vapor pressures of the solvents of these inks were as low as the vapor pressure of Gessler's illustrative solvent at room temperature and were from 2 to 5 cm. at 150° C., all approximating the vapor pressure of alcohol (4 cm.) within a couple of centimeters.

After these inks based on the Gessler disclosure had proved their merits, after respondent's demonstrations had caused printers to invest in rotary presses for magazine printing and to furnish them with heaters, petitioner, re-

ceiving information from one of respondent's suppliers, duplicated one of respondent's commercial inks and sold it to respondent's customers for use on presses with heaters which had been installed for drying respondent's ink. The operation of petitioner's ink on such presses is identical with that of respondent's. Petitioner is thus obtaining the full advantage of Gessler's disclosure without having contributed anything to the making or introduction of the ink.

The basis of this Court's holding of infringement in a recent case applies literally to the facts of the present case:

> "the petitioners consciously copied the respondent's commercial cell, which was made in accordance with the claims of the patent." (*Goodyear Tire & Rubber Co., Inc.* v. *Ray-O-Vac Co.*, 321 U. S. 275, 278).

Petitioner's New Contention.

In this Court petitioner has taken a new position on infringement. Below, petitioner's only argument against infringement was a purely technical one based on misconstruing the words of the Gessler claims. Petitioner has apparently realized that a purely technical argument cannot prevail in this Court. In seeking to give substance to its technical position, petitioner has, for the first time in the history of this case, asserted that there is a practical difference between the drying of its ink and the ink of the patent.

Petitioner cannot deny that the vapor pressure of the solvent in its ink at 150° C. approximates the vapor pressure of alcohol within 2 cm.; but petitioner asserts that this difference of 2 cm. makes an important practical difference in the use of the ink.

Petitioner's contention is that, while Gessler's original ink could be dried instantly when the paper was passed around a steam drum heated to "between 100°C. and 150°C." (Brief, p. 23), the successful use of petitioner's ink "requires the heat of a flame heater" (Brief, p. 34) which is very much hotter than a steam-heated drum (Brief, p. 22).

As this contention was not made in either of the lower courts, there is nothing in any of the findings or opinions dealing with it. If this new contention is to be considered by this Court, therefore, this Court is called upon to act as a jury to determine from the record whether or not petitioner's new contention is true. Respondent's position is that petitioner's last-minute contention is a fiction advanced by petitioner to meet the exigencies of this case and is unworthy of consideration by this Court. As this question of fact is new, we shall deal with it in some detail:

The basis for petitioner's new contention is a confusion of two very different things: (a) the temperature to which something is heated, and (b) the means by which it is heated to this temperature.

a. Temperature

The vapor pressure and rate of evaporation of a liquid depend upon the temperature of the liquid and not at all upon the method or means used to bring the liquid to this temperature. The problem of making a quick-drying ink, which the Gessler patent solved, involved the matter of temperature.

It would have been easy—and useless—to make an ink which could be dried instantly by burning up the paper on which it was printed. Gessler's invention provided an ink capable of instantaneous drying at a temperature as

low as 150°C. which would not char the paper. This fact was clearly brought out in the three passages from the file-wrapper (II, pp. 790, 840, 890) quoted on page 23 of petitioner's brief. Petitioner has omitted the part of the sentence on II, p. 840, which stated that the temperature of McElroy's die—500°F. or 260°C., far above the temperature of 150°C. mentioned in the Gessler patent—"would burn the paper on which the print was made". (II, p. 840)

b. Means for Heating

After Gessler had created an ink which dried instantly at a temperature to which paper may safely be heated, the question of how the paper shall be raised to this temperature in the use of the ink was a purely mechanical one. The heaters which are used commercially for this purpose include the following:

(1) A heated drum or roller around or against which the web of paper is drawn. The heat is transferred from the hot metal roller to the paper in contact with it rapidly so as to bring the paper up to substantially the same temperature as the roller. This type of heater had long been used in rotogravure presses. It has been used at the Curtis Publishing Company's plant both for inks made with Gessler's original illustrative solvent and with those made from the cheaper petroleum solvent (I, pp. 79, 80, 82, 88).

(2) A blast of hot air heated to the temperature to which the paper is to be raised is blown against a long section of the paper web. This heating means was also familiar in rotogravure presses. It is used on typographic presses in two commercial plants to heat inks of the Gessler type made with petroleum solvents (I, pp. 158, 617)[1].

[1] The references to hot air heating on these pages are referred to in petitioner's brief on page 17 as uses of flame heaters.

(3) The flame of a pressure gas burner directed upon or close to a short section of the paper web. In this case, the heat is transferred to the ink and paper, not from hot metal, but from hot gas. In order to raise the temperature of the ink and paper during the fraction of the second while it is passing by the gas burner,[1] it is necessary to have the gas at a temperature far above the temperature to which the paper is to be raised. Thus, such heaters are operated at temperatures of from 1200° to 1500° F. to heat the paper to 275° F. which is 135° C (I, pp. 68, 70, 92). Such a heater is described in the Brunell patent applied for in 1924 which shows the mechanical arrangements necessary to turn off the gas when the paper stops or slows down in order not to burn the paper.[2] Heaters of this sort are used in several, but not all,[3] large magazine plants for drying the inks based on the Gessler disclosure.

(4) A hot drum and a gas flame have been used in combination to dry inks of the Gessler type containing the original illustrative solvent (I, p. 187, Q 15; p. 206, XQ 41).

(5) Combinations of the various types are not uncommon in commercial installations:

> "We do not use gas in all heating cases. We resort to the use of steel steam drums and also to the use of plain hot air in some cases, and we also use in these extra fast presses a combination of a hot oil drum, a ribbon burner and hot air in addition to that. All three types are used on some of the presses today". (I. p. 94)

All the commercial heaters are necessarily so used as to avoid heating the paper to a temperature which would

---

[1] I, p. 70.

[2] *Ante*, p. 6.

[3] The Curtis Company, one of the largest users of ink in the country (I, p. 102), has used a steam-heated drum.

scorch it. In gas heaters, the gas must be regulated in accordance with the speed of the paper in order to avoid scorching. This was so obvious to the District Court that it was not elaborated in the testimony (I, pp. 93, 94, 530). An economical printer uses no more gas than he finds necessary to dry the ink (I, p. 156). The testimony indicates that the usual temperature of the paper in the various heaters is about 275° F., which is 135° C. (I, pp. 70, 205, 617).

Selection among the various types of heaters available is made on the basis of the amount of space and time available for heating the paper up to the drying temperature of the ink (I, pp. 98, 99). It does not depend upon which of the various commercial inks based on the Gessler disclosure is to be used. The commercial inks have solvents whose vapor pressures at 150° C. are within the range of from 2 cm. to 6 cm. This is true both of the inks manufactured by respondent under the patent and the inks which have been sold by the Curtis ink-maker who first imitated the original Gessler ink.[1] There is no evidence in the record that this slight variation has had any effect on the choice of the heaters used to dry the inks.

Kerley's Testimony

The only thing in the record which gives any shadow of support to petitioner's contention that flame heaters are necessary to dry petitioner's ink is found in the testimony of petitioner's witness Kerley, repeatedly cited in its brief:

> "Q. Do you know whether or not the advent of a good oven had anything to do with the success of heat-set inks? A. I would say without an oven you could not run any of them. * * *

[1] I, pp. 126, 640-41.

"Q. And it wasn't until later that you got a successful heater? A. That is right, high pressure type.

"Q. And that, you think, has largely to do with the success of these inks? A. Yes, I think so" (I, p. 551, cited Pet. Br., pp. 17, 21, 22).

Before these vague expressions of opinion can be given any probative value, the reliability and knowledge of the witness must be considered:

Kerley failed in the printing ink business (I, p. 562), then worked as a salesman for others, tried unsuccessfully to develop a heater for drying linseed oil (I, p. 565), and then went to the Hall Printing Company in 1937 (I, p. 561). In his direct testimony, he said that neither respondent's nor petitioner's ink was satisfactory, and that the only good heat-set ink was one which he made himself (I, pp. 548, 550, 546, 550). At the time to which he referred, respondent's ink had already been in successful commercial use in printing "Life" for several years.[1] On cross-examination, the witness admitted reluctantly that the Hall Publishing Company had used respondent's ink before the witness had made any ink (I, p. 564), and he could not deny that it was on the strength of this that they had invested in heaters before the witness came with them (I, pp. 571-572). He admitted also that what he had referred to in direct testimony as "making" a heat-set ink consisted merely in pigmenting and adjusting the base of such an ink which he had purchased with the solvent in it (I, pp. 565-566).[2] He refused to disclose the source from which he had purchased the unpigmented ink (I, pp. 565-568).

[1] Testifying in 1943, the witness said that it was only within the last two years, that is after 1941, that respondent had made satisfactory inks. Respondent's inks have been used in printing "Life" since 1936 (I, pp. 588-589).

[2] See I, p. 219.

He admitted that he had had no acquaintance with heat-set inks before 1937 (I, p. 563).

Kerley did not claim to have any accurate knowledge as to the temperature of heaters:

> "Q. How hot are they? A. Well, we have measured to a degree as possible; they go from the tip of the flame, from 1700 to 1900 degrees of heat, but on the traveling web I would say they don't take over 350 to 400 [177° C.-204° C.] degrees of heat" (I, p. 550, cited Pet. Br., pp. 17, 23).

It is apparent from this answer that the witness was merely guessing at the heat of the paper. He did not attempt to state the temperature to which the paper had to be heated in order to dry the ink or the temperature to which the paper could be heated without scorching.

We submit that this witness' opinion as to what sort of heater is required for any particular heat-set ink is no more valuable than his opinion that respondent's highly successful heat-set ink is unsatisfactory.

Furthermore, his opinions do not purport to show the peculiar heater requirements of petitioner's ink or of any other ink whose solvent had a vapor pressure at 150° C. of precisely 2 cm. He lumped together petitioner's ink (2 cm. at 150° C.) and respondent's ink (2-5 cm. at 150° C.) and said there was no difference between them (I, pp. 546, 547, 550).

A complete answer to petitioner's contention that its ink required a special heater or an usual degree of heat is found in the proofs as to the use of respondent's ink by the Crowell-Collier Publishing Company, printers of *Collier's* and other magazines. The manager of this company testified that his company was using both respondent's and petitioner's quick-drying inks, and that there was no

difference in their action on the press or in drying (I, p. 238, first two Qs). He also said that inks of this type were dried *either by contact with a steam drum or by passing through a gas oven* (I, p. 237). When cross-examined as to the heat of the gas oven used on his presses, he said:

> "Q. How hot do those ovens get, about? A. Well, of course it depends entirely on the speed of the press. I am quite sure it is around 1400 degrees.
>
> Q. Fahrenheit? A. Fahrenheit, yes. *We don't use that much heat but some people do. We use about 950 degrees I think.*" (I, p. 505).

Here is direct proof by an impartial witness that petitioner's ink is being dried commercially in an oven operated at a temperature much lower than that usually used for drying respondent's inks.

We submit that there is no basis whatever for a fact finding that petitioner's ink *required* any different type of heater from the original Gessler ink and all the other inks based on the Gessler disclosure. No such finding was made by either court below, and there is nothing in the record to support such a finding by this Court.

Petitioner's contention that there is a practical or observable difference between its ink and the original Gessler ink should be disregarded as contrary to the proofs. The record makes it entirely clear that the petitioner is a late-comer who has selected the solvent of its ink so as to obtain the full benefit of Gessler's disclosure.

Petitioner's Technical Argument.

There remains only the technical argument which petitioner presented below. It involves the words of the claims and the filewrapper:

Petitioner first tries to construe the claim without reference to the invention which is described in the specification (Pet. Br., p. 3), and rewrites the claim to divorce it from the invention so as to be able to argue in the abstract that 20 cannot approximate 40 (Pet. Br., pp. 4, 5). Petitioner is disregarding the famous words of Justice Holmes:

> "A word is not a crystal, transparent and unchanged, it is the skin of a living thought and may vary greatly in color and content according to the circumstances and the time in which it is used.[1]

And this is still more true of figures which convey nothing when they are separated from the connection in which they are used.

Thus, the question is not whether 20 approximates 40 or whether 2 approximates 4 in the abstract. It is whether the vapor pressure of a highly volatile liquid approximates the vapor pressure of a typical highly volatile liquid when both evaporate at substantially the same rapid rate. Considered from this realistic point of view, it is evident that the vapor pressure of petitioner's solvent at 150° C., which is equal to the vapor pressure of the volatile liquid toluol, approximates the vapor pressure of the typical volatile liquid alcohol.

The filewrapper fortifies this conclusion. The claims first presented show that Dr. Gessler recognized that the *precise* value of the vapor pressure at elevated temperature was not a *sine qua non* of the use of his invention. The filewrapper shows that Dr. Gessler had this idea from the time he filed his application, not merely at a later date when he located a second solvent suitable for use in his ink.

The difficulty with the rejected claims was that they were functional and broad enough to include a solvent which

---

[1] *Towne* v. *Eisner*, 245 U. S. 418, 425.

was raised to its boiling point in order to evaporate it.[1] The claims were amended to limit them definitely to the actual disclosure in the specification—the instantaneous drying of the illustrative ink by heating it "to about 100° C. or above" where the solvent was far below its boiling point[2] and had a vapor pressure like that of the volatile liquids of which alcohol is typical.

The filewrapper clearly shows that both applicant and the examiner understood the expression "approximates the vapor pressure of ethyl alcohol" to allow a leeway of a couple of centimeters. This is pointed out in the opinion of the Circuit Court of Appeals:

> "That the word 'approximates' gives leeway of at least 2 cm., is plain, since the vapor pressure of the solvent especially recommended in the specification was 6 cm., at 150° C., that is to say, 2 cm. greater than the pressure of ethyl alcohol at ordinary temperature" (II, p. 1103).

Petitioner objects that the leeway was intended to be only in one direction, namely, in the direction which would exclude petitioner's solvent. This objection is met by the specification and the filewrapper which show that the vapor pressures which applicant regarded as too low to approximate that of alcohol were all below one centimeter:

In the third passage from the filewrapper which petitioner's brief quotes on page 23, applicant said that his ink could not be made with a solvent having

> "a comparatively low vapor pressure at 150° C., as in this case it could not be vaporized instantly by any heat which can safely be applied to printing matter" (II, p. 891).

---

[1] Such as Hanson's hypothetical solvent with a "flattened" vapor pressure curve (See *ante*, pp. 33-34).

[2] The boiling point of the illustrative solvent is 225°–230° C.

The meaning of "a comparatively low vapor pressure at 150° C." in this statement is shown by parts of the statement which petitioner does not quote. The statement distinguishes prior patents from the claims on the ground that the vapor pressures of their solvents are too low at 150° C. These patents describe inks having solvents with vapor pressures below one centimeter at 150° C. (II, p. 893 2nd and 4th pars.). This confirms the conclusion which the Circuit Court of Appeals drew from the specification:

> "The degree of difference that was regarded as precluding an approximation is illustrated by the solvent dibutyl phthalate mentioned at page 2, line 9, of the Patent as being a pressure of only .14 cm. at 150° C. and evaporating slowly" (II, p. 1103).

The leeway is clearly intended to extend a couple of centimeters in both directions. "Approximates" does not mean "as great as."

And even if petitioner's construction of the claim were possible, it cannot be adopted under this Court's decisions:

> "* * * there being nothing shown in the state of the art which requires any such construction of the second claim as that contended for by the defendant, and it being fairly susceptible of the opposite construction, and the latter being one which is commensurate with the real invention embraced in the second claim, and one which prevents the real substance of that invention from being bodily appropriated by an infringer, it is proper to give the claim such a construction." (*Lake Shore &c., R. Co.* v. *Car-Brake Shoe Co.*, 110 U. S. 229, 236).
>
> "If the matter were doubtful, it is plain from what has been said that the character of the patent and its commercial and practical success are such as to entitle the inventor to broad claims and to a liberal construction of those which he has made. *Moreley*

Machine Co. v. *Lancaster,* 129 U. S. 263, 273-277; *Eibel Co.* v. *Paper Co.,* 261 U. S. 45, 63; *Winans* v. *Denmead, supra,* 341. In such circumstances, if the claim were fairly susceptible of two constructions, that should be adopted which will secure to the patentee his actual invention, rather than to adopt a construction fatal to the grant, *Keystone Manufacturing Co.* v. *Adams,* 151 U. S. 139, 144, 145; *McClain* v. *Ortmayer,* 141 U. S. 419, 425." (*Smith* v. *Snow,* 294 U. S. 1, 14).

We submit that the Circuit Court of Appeals was correct in holding that petitioner's ink is as clearly within the intended meaning of the words of the claims of the Gessler patent as it is within the scope of the invention which Gessler made.

CONCLUSION.

The Opinion of the Circuit Court of Appeals shows that the court found the brief findings of the District Court altogether inadequate to present the facts bearing on validity and infringement and clearly erroneous as to the prior patents. Mindful of its obligation under the Rules, the Appellate Court reached this conclusion only after a thorough study of the record which enabled the Appellate Court to make the first adequate statement of the facts in the case. These facts clearly set forth in its opinion can lead only to the conclusion that the patent is valid and infringed.

The decision of the Circuit Court of Appeals should be affirmed.

Respectfully submitted,

ROBERT W. BYERLY,
RALPH M. WATSON,
Counsel for Respondent.

SUPREME COURT OF THE UNITED STATES.

No. 656.—October Term, 1944.

Sinclair & Carroll Company, Inc., Petitioner, *vs.* Interchemical Corporation.	On Writ of Certiorari to the United States Circuit Court of Appeals for the Second Circuit.

[May 21, 1945.]

Mr. Justice Jackson delivered the opinion of the Court.

This infringement suit was brought by the assignees of a patent on a printing ink. Respondent, Interchemical Corporation, asserts that inks made by the petitioner infringe on claims 3, 10, 11, 12 and 13 of U. S. Patent No. 2,087,190 which was issued to Albert E. Gessler on July 13, 1937. Claim 3, which is typical, is as follows: "A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having vapor pressure which at 150°C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component.". In other words, Gessler claims to have invented an ink which will not dry at room temperature but which will dry instantly upon the application of heat after printing. Such an ink is of no particular value in the printing of newspapers or other publications which use absorbent paper. This can be done acceptably with ordinary inks containing linseed oil which is non-volatile at all relevant temperatures. The paper absorbs the ink when one side is printed, and the other side can be printed immediately without danger of smudging.

But the ink disclosed in the patent does have utility in the printing of magazines and other materials which use smooth non-

absorbent paper. Since its disclosure by Gessler, it or similar inks which are claimed to infringe, have been used to print "The New Yorker", "Collier's", and "The Saturday Evening Post." Such publications previously would require considerably more time for printing since the reverse side of the paper which they used could not be printed until the first side was dry. Nor could the sheets be stacked or folded without danger of "offset" printing. The smooth paper would not absorb the linseed-oil inks, and delay of from one to twenty-four hours was necessary before printing was sufficiently dry to allow the sheets to be worked upon again.

Many efforts were made to eliminate the necessity for delay. The problem was complicated by the fact that the presses used in this kind of printing are equipped with a long series of ink-distributing rollers to spread out the ink to the optimum thin film before it is applied to the type. Hence, when inks with volatile components were used, they would dry on the rollers before they got to the type. And if inks with non-volatile ingredients—like linseed oil—were used, they would not dry except by slow oxidation. Other approaches to the solution of the problem included the exposure of sheets printed from linseed-oil inks to ozone, but that process was dangerous and not wholly satisfactory. Gessler's ink combines the qualities of an ink which does not dry on the rollers and one which dries quickly after printing when heat is applied to it.

These characteristics of the ink result from the nature of the solvent which is one of its components. Gessler, in his specification, named butyl carbitol (diethylene glycol monobutyl ether is said to be the more accurate scientific term) but that compound was given only as an example, and most of the inks which his company now makes contain "narrow cuts" of petroleum in place of butyl carbitol. A narrow cut of petroleum consists of only a few kinds of hydrocarbons, and consequently evaporates consistently since each of the hydrocarbons has substantially the same vapor pressure curve. The allegedly infringing inks similarly are made with narrow cuts of petroleum. All of these solvents have the peculiar quality of being relatively non-volatile at ordinary room temperature but highly volatile at a temperature of 150°C., a temperature to which paper can safely be heated without burning. There is no question that inks containing these solvents have enabled magazines to be printed on high-speed rotary

presses which are furnished with heating devices, without interruption for drying.

The District Court held Gessler's patent invalid because anticipated by the prior art, and held that the petitioner's inks did not infringe. *Interchemical Corporation* v. *Sinclair & Carroll Co.*, 50 F. Supp. 881. The Circuit Court reversed, holding the patent valid and infringed. *Interchemical Corporation* v. *Sinclair & Carroll Co.*, 144 F. 2d 842. We granted certiorari. — U. S. —.

There has been a tendency among the lower federal courts in infringement suits to dispose of them where possible on the ground of non-infringement without going into the question of validity of the patent. *Irvin* v. *Buick Motor Co.*, 88 F. 2d 947, 951; *Aero Spark Plub Co.* v. *B. G. Corp.*, 130 F. 2d 290; *Franklin* v. *Masonite Corp.*, 132 F. 2d 800. It has come to be recognized, however, that of the two questions, validity has the greater public importance, *Cover* v. *Schwartz*, 133 F. 2d 541, and the District Court in this case followed what will usually be the better practice by inquiring fully into the validity of this patent.

A long line of cases has held it to be an essential requirement for the validity of a patent that the subject-matter display "invention", "more ingenuity . . . than the work of a mechanic skilled in the art." *Hicks* v. *Kelsey*, 18 Wall. 670; *Slawson* v. *Grand Street R. Co.*, 107 U. S. 649; *Phillips* v. *Detroit*, 111 U. S. 604; *Morris* v. *McMillin*, 112 U. S. 244; *Saranac Automatic Machine Corp.* v. *Wirebounds Patents Co.*, 282 U. S. 704; *Honolulu Oil Corp.* v. *Halliburton*, 306 U. S. 550; *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84, 90. This test is often difficult to apply; but its purpose is clear. Under this test, some substantial innovation is necessary, an innovation for which society is truly indebted to the efforts of the patentee. Whether or not those efforts are of a special kind does not concern us. The primary purpose of our patent system is not reward of the individual but the advancement of the arts and sciences.[1] Its in-

[1] See the testimony of Commissioner Coe before the TNEC: "It is not the principal purpose of the patent laws of our country or of any nation to reward an individual. The purpose is much deeper and the effect much wider than individual gain. It is the promotion of science and the advancement of the arts looking to the general welfare of the Nation that the patent laws hope to accomplish. The individual reward is only the lure to bring about this much broader objective. Every patent granted benefits society by adding to the sum total of human knowledge, but that is not enough, and that alone will not achieve the ultimate goal of the patent system." TNEC Hearings, Part 3, p. 857.

ducement is directed to disclosure of advances in knowledge which will be beneficial to society; it is not a certificate of merit, but an incentive to disclosure. See *Hartford Empire Co.* v. *United States,* decided Jan. 8, 1945, p. 33. Consequently it is not concerned with the quality of the inventor's mind, but with the quality of his product.

The patent in suit was not the product of long and difficult experimentation. Although like other patent cases, this has an extensive record, it is hard to see wherein Gessler's invention consists. In 1930, he was asked to make an odorless ink, and he selected from a catalog of a chemical manufacturer three solvents which the catalog indicated to be relatively odorless. Their vapor pressures, that is, their rates of evaporation at various temperatures, were also listed. He tried inks made with each of the compounds as a solvent and decided that butyl carbitol was the most satisfactory, since it did not dry while on the rollers, at ordinary temperature.

The company which had requested the odorless ink, however, found that it was unsatisfactory for other reasons and, after some further effort, Gessler stopped trying to solve that problem. Sometime in 1932, however, the same company asked Gessler whether he could supply them with an ink "that would be dry after being printed? We can put it over some kind of heating device." Gessler's answer was, "Yes, I think we could. In fact, one of those inks I made for you in the beginning would do that." Gessler testified as follows: "And now, when Mr. Cray came, in the year 1932, and told me that heating units, steam-heated rollers are used on printing presses, that was the last key that I needed for the solution of the problem. I had not known that before, and I knew that if I could apply any heat to the thin film of those inks that they would dry almost instantaneously. With that in mind that was the mental background, I would say, that I sent this particular ink to Mr. Cray. I did not send him a number of inks or a selection of inks, but I sent him just one specific ink." And with respect to the solvents he had chosen, Gessler testified further:

> Q. What I want to get straight in my mind, Dr. Gessler, is this: You selected these three, is that right? A. That is right.
>
> Q. Did you select them from a much longer list? A. That is right.
>
> Q. And before you selected them you tried them all out, did you? A. No. You see the list is listed according to the

boiling point, and if you followed on I took it from a certain boiling point on upwards.

Q. Oh, I see. You took them out of a long list in accordance with their boling point? A. That is correct. That was my first indication of evaporation rate.

. . . . . .

Q. . . . In selecting these three solvents that you referred to, butyl cellosolve, carbitol and butyl carbitol, did you have reference to a Carbide & Carbon Chemicals Corporation catalog? A. I knew them. I don't know if I had reference, but I knew naturally those solvents.

Q. You may have referred to a catalog? A. I may have, certainly. I most probably had the catalog.

Q. You got copies of their catalogs, did you? A. Oh, yes.

. . . . . .

Q. On the fly-leaf of the Carbide & Carbon catalog there is a list of their products. Do you remember that list (handing to witness)? A. A similar list.

Q. That gives boiling points and vapor pressures? A. It does.

Q. And you may have selected these three solvents that we are talking about from that list? A. That is possible, although I knew the solvents. I was very conversant with them. I told you a while ago why.

Butyl carbitol was first put on the market in 1929, and subsequently was listed in the catalogs of Carbide & Carbon Chemicals Corporation. It cannot be said that Gessler's contribution was a recognition that a solvent having the peculiar qualities of negligible vapor pressure at room temperature and high vapor pressure at 150°C was what was needed. Both the circuit court and the district court found that an article written in 1931, referred to as the Hanson article, had posed the problem.[2] It is difficult to believe that if Hanson had known of the qualities of butyl carbitol, if he had had the Carbide & Carbon catalog before

[2] The relevant part of the Hanson article, which appears in the record, is as follows: "The solvents available have different boiling points ranging through a broad scale, but unfortunately for this problem their vapor pressure curves are nearly parallel. If we choose one from the group with a boiling point well under 250° F. [121° C.], the highest practical heat to apply to a printed sheet, we find that at room temperature its vapor pressure is still so great that drying will progress rapidly. On the other hand, if one is selected with a vapor pressure so low at room temperature that little drying takes place, at 200° to 250° F., we find the boiling point hardly attained or not even reached.

"If we could only flatten the curve of a high boiling solvent with a vapor pressure of 1 in. of mercury or less at 80° down to a point where at 30 in. the boiling temperature would be reduced to only 150° or so it would not take us long to compound an ink to meet the general characteristics for a plastic ink set forth above."

him, he or any other person skilled in the art could not have devised the ink which Gessler claims to have invented. We reach this conclusion even though Hanson testified in an affidavit introduced in support of a motion for rehearing that he had worked for over a year trying to produce such an ink and did not succeed.

The District Court based its judgment on anticipation by prior patents. Most of these pertained to inks which were not used in ordinary printing: Lefferts and Stevens, No. 380,654, issued April 3, 1888, was an ink used for printing on celluloid and other pyroxyline compounds; the Doughty and McElroy patents, Nos. 1,439,696 and 1,450,692, issued December 26, 1922 and April 3, 1923 taught an ink which was mainly useful for stamping with metallic inks by means of heated dies. But the Jirousek patent, No. 1,954,627, issued April 10, 1934 was for an ordinary printing ink. Jirousek's patent was directed to "a composition . . . which can set quickly and dry rapidly and also handle and feed properly and distribute freely." And the patent specifies, "In the use of such compositions, immediately after the impression is made, heat should be applied, and most advantageously this may be accomplished by a suitable heater, electric, gas, etc., arranged on or adjacent the press, so that the delivered printed impression is subjected to a substantial degree of heat to complete the setting action."

The inks disclosed in these prior patents did not contain the same solvent or solvents similar to those which Gessler recommended and which his company and the petitioners now use. They had different vapor pressures both at room temperature and at 150° C. But all these patents taught an ink made with a solvent that would be non-volatile at room temperature and highly volatile when heated. Gessler's solvent is undoubtedly more satisfactory than any of the solvents mentioned in these patents, but it must be remembered that all but one of these patents were granted before butyl carbitol appeared on the market. The fact is that Gessler himself to a large extent has abandoned butyl carbitol and now uses a narrow cut of petroleum. Even assuming that if Gessler had discovered the compound he would be entitled to a patent, he did not discover it. Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put into the last opening in a jig-saw puzzle. It is not invention. The judgment below is reversed.

Mr. Justice BLACK and Mr. Justice DOUGLAS concur in the result.